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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/972,576	10/05/2001	Petrus Hubertus Cornelis Magnee	NL 000549	4658

24737 7590 12/12/2003

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BRIARCLIFF MANOR, NY 10510

EXAMINER

IM, JUNGHWA M

ART UNIT PAPER NUMBER

2811

DATE MAILED: 12/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/972,576

Applicant(s)

MAGNEE ET AL.

Examiner

Junghwa M. Im

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5,9 and 10 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5,9 and 10 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

Claims 2 and 5 are objected to because of the following informalities.

Claim 2 has a typological error. “ said shallow region is and emitter” should be --said shallow region is an emitter--.

Claim 5 recites “said second breakdown voltage” without an antecedent basis.

Claim 10 recites “said first breakdown voltage” without an antecedent basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 10 recites “channel stopper further reduces said second breakdown voltage relative to said first breakdown voltage.” Since there is no antecedent basis for the breakdown voltages, comparison between two breakdown voltages cannot be made.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4^{and 9}₁ are rejected under 35 U.S.C. 102(b) as being anticipated by Pao et al. (US 4344081).

Regarding claim 1, Figure 10 of Pao shows a semiconductor comprising

a substrate layer (10) with an upper surface and a lower surface, the substrate layer being a first conductivity type (N);

a first buried layer N⁺ (a left side portion of the layer 12) in the substrate, extending along said lower surface below a first portion of said upper surface of said substrate layer, and a second buried layer N (a right side portion of the layer 12) in the substrate, extending along said lower surface below a second portion of said upper surface of said substrate layer;

a first diffusion region (20; col.4, lines 44-46) in said first portion of said substrate layer, being of a second conductivity type (P) opposed to said first conductivity type (N) and having a greatest depth at a first point along a width of the first diffusion region and having a lesser depth at a second point along said width; and

a shallow region (32) in said first portion of said substrate layer, being of said first conductivity type (N) and being on top of said second point of the first diffusion region but not on top of said first point of the first diffusion region.

a second diffusion region (22; col.4, lines 44-46) in said second portion of said substrate layer, being of a second conductivity type (P).

Regarding claim 2, Figure 11 of Pao shows the first diffusion region (20) is a base of a

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bipolar transistor, said shallow region (32) is an emitter of said bipolar transistor and the first buried layer (12) is a collector of said bipolar transistor.

Regarding claims 3 and 9, the device shown in Figure 10 of Pao inherently shows the second diffusion region (22; P type) is an anode of a pn diode and the second buried layer (a right side portion of the layer 12; N type) is a cathode of the pn diode (col.7, lines 33-36).

Regarding claim 4, Figure 10 of Pao shows the first buried layer is connected to said second buried layer, and the first and second buried layers are manufactured in the same step.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 5 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pao in view of Harmel et al. (US 5410177), hereafter Harmel.

Regarding claim 5, Figure 10 of Pao shows the most aspect of the pending claim except "a channel stopper region in said second portion of said substrate layer; the channel stopper region being of said first conductivity type, for electrically isolating said second portion of said substrate layer within the substrate, wherein said channel stopper region is arranged to extend substantially as an extended channel stopper region in between said second diffusion layer and said second buried layer for reducing a breakdown voltage."

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Figure 1a of Harmel shows a channel stopper layer (CS; N type) formed in a buried region (a left side portion of the region 9; a portion having an anode A; N type) and the channel stopper region is arranged to extend substantially in between the diffusion layer for the anode (A) and the buried layer (a right portion of the buried region 9; a portion with the BJT formation) to adjust a breakdown voltage (col.2, lines 39-54).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Harmel into the device of Pao in order to have a channel stopper layer in the specified region as recited in the claim since an addition of the channel stopper to the specified region would alleviate an effort to adjust the breakdown voltage with a manufacturing advantage.

Note that pending claim recites that a channel stopper formation in the in said second portion (a portion with a diode formation) of the substrate layer; the channel stopper region being of said first conductivity type (N; the same type to the substrate and the buried layer), for electrically isolating said second portion of said substrate layer within the substrate, wherein said channel stopper region is arranged to extend substantially as an extended channel stopper region in between said second diffusion layer (a region with an anode formation) and said second buried layer (a right side portion of the layer 12).

Regarding claim 10, insofar as understood, Figure 10 of Pao shows the most aspect of the pending claim except a channel stopper region between said second diffusion layer and said second buried layer for reducing a breakdown voltage.

Figure 1a of Harmel shows a channel stopper layer (CS; N type) formed in a buried region (a left side portion of the region 9; a portion having an anode A; N type) and the channel

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stopper region is arranged to extend substantially in between the diffusion layer for the anode (A) and the buried layer (a right portion of the buried region 9; a portion with the BJT formation) to adjust a breakdown voltage (col.2, lines 39-54).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the teaching of Harmel into the device of Pao in order to have a channel stopper layer in the specified region as recited in the claim since an addition of the channel stopper to the specified region would alleviate an effort to adjust the breakdown voltage with a manufacturing advantage.

Response to Arguments

Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Junghwa M. Im whose telephone number is (703) 305-3998. The examiner can normally be reached on MON.-FRI. 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie C Lee can be reached on (703) 308-1690. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9318.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

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Jmi

December 10, 2003

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STEVE LOHE